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THE ROYAL FAMILIES OF PLANTS.

No. II.

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THE second of the royal lines in the vegetable world affords a view greatly different from the first. That, it will be remembered, consisted of the composite flowers, or the Family of the *Asterids*. Now we will contemplate for a while the family of the second degree of botanical importance. It is familiarly known to us in the Pea and Bean. It has long been called by students the *Leguminosœ;* that is, the Leguminous Plants, or those bearing a legume, or simple pod, for a fruit. Lindley thought proper, in arranging the "Vegetable Kingdom," to call this family the *Fabaceœ*, from *faba*, a bean; but if the reader please, we will employ a title for them here shorter and more convenient, and derived from the group that best typifies the family, which the bean does not. We will term them the *Pisids*, from *pisum*, or the Pea.

The royalty of these *Pisids* is quite different from that of the *Asterids*. Those challenge admiration by their vast numbers and universal presence; but these more by their peculiar nobility of style, whether as to beauty or grandeur. Not that these are much inferior, numerically; for, in the best enumerations of the day, six thousand five hundred species are reckoned, arranged in four hundred and sixty-seven separate groups or genera. We have no calculations made so recently as to warrant our stating very exactly the geographical distribution of these species in various regions. They are not, however, greatly disposed to stray about and play the emigrant over the world's broad acres; but are rather remarkable for sitting down quietly at home, and enjoying their separate dignities in their original possessions, as self-satisfied as the old grandees of Spain. Thus there are species in Australia that no other country can furnish; for they have never travelled from the island yet, whatever they may be tempted to do hereafter. So with those found at the Cape of Good Hope; and even of the European genera there are some that never have penetrated into either Asia or Africa more than a very little way. Yet, in one form or another, they are met with almost everywhere; in fact, we hear only of two spots entirely without them, namely, the islands of St. Helena and Tristan d'Acunha; and perhaps it detracts nothing from the royal wisdom of these plants that they have kept themselves clear of two such Heaven-forsaken places.

Before, however, proceeding too warmly into the admiration of this grand order, we should give the reader some simple means of recognizing it when he meets it. In these familiar views of natural families, we like to bring luminously before the eye of the untechnical lover of plants the few constant marks that we hold to exist in every such family *somewhere*, as the true key to all their mutual relationships, and the fit signs by which they may be readily and definitely known. Now, as we had three marks whereby certainly to know an *Asterid*, so we have three that as certainly indicate a *Pisid;* but whereas in the other case all three are always present, here one may be absent, but never two, and one never disappears at all.

Get the first pea, bean, or locust flower you see. A large flower is easier to study than a small one, and these are the largest we have. The Sweet Pea is, perhaps, best of all, but the bean-flower has some obscurities to the common eye. Turn the flower face to face with you.

All flowers, or at least the great majority, are made up of five leaves or petals; and so is this, if you will believe it. But you can hardly see any such structure; it merely looks like a miniature lady's head in a high-front bonnet of the year 1838. Or perhaps it suggests the idea to you that it has to scores of others, who for years have likened such flowers to butterflies. Hence these plants are often called *Papilionaceous*, from *papilio*, a butterfly. Such notions are all fanciful; but the structure of these flowers is quite decisive. As you now hold it, the large, showy top leaf or petal is one only, and, we might say, about as large as it should be. Below it, right and left, are two more, mated like your gloves; these have been called the *wings*. They are considerably reduced, usually paler, and sometimes of a very different color from the large one above, which we may call the *banner*. This makes three petals. Next, between the wings, wrapped up in them closely in some cases, is what does not look much like a petal or leaf of any sort; but is really the fourth and fifth, very little developed, and grown together by the edges. They make what has always been called the *keel*. This is the structure of the Pea-flower the world over. It never appears outside of the Royal Family of *Pisids*, and it is present there in a vast majority of cases. It is one of the three badges of their regal character.

Next, take a pea or bean-pod, just fit to shell. It is one-sided in its form; that is, the point farthest from the stem is on one side more than the other, so that of the two seams at the edges of the pod one is nearly straight, and one very much rounded. Now split this pod cautiously along the *straight* side. The seeds lie within, and if you have done the thing nicely, you have laid the pod open flat, with each half claiming the alternate seeds, so that in a well-filled pod of peas, about four are found growing on one side, and as many on the other. This is the structure of the *legume*, or simple pod. Possibly it appears, in some instances, outside the royal family; but very rarely, indeed, if ever. It is not like the pods of the Mustard and Gilliflower, for they have a partition running through them flatwise, and the seeds hang upon both seams instead of one. The pods of the Milkweeds are very different, again, being mere bags in which the seeds are enclosed without the least attachment to any part, but grow upon the end of the stem where it passes into the interior. The simple pod, or *legume*, then, is the second mark of the *Pisids*, and any one can tell it at a glance.

The third mark is simple, curious, and infallible, to the highest degree. The family most likely to be confounded with these is that to which the Rose and the Apple belong; in fact, though we might not expect it, the two run so closely together, that only this third mark is decisive as between them. And yet, all-important as it is, it seems the merest trifle. Look at the bottom of the Pea-flower, outside. There are five small, green, pointed leaves surrounding it, that together are called the calyx, and severally are termed sepals. Now find a flower that grows pretty low down on the stem,—from the angle of a leaf perhaps,—and carefully lift it up against the stem without giving it any twist one way or the other. Thus you bring the real top of the flower to the stem. Notice, now, that if you have worked fairly the stem comes, not against one of the green sepals, but into the notch or space between the upper two of them. The odd sepal, so to speak, is on the outer or lower side. If we had taken a rose or an apple-blossom or the flower of a Spiræa, and so examined it, we should have met just the reverse; the odd sepal will always be found at top, or next the stem. The invariability of these facts is really wonderful. It is one of those great little things whose discovery sheds such lustre on the genius of Robert Brown, the man whose eye pierced more keenly through the vegetable millstone, than any other man's before or since his time.

Recapitulate then. The marks of the *Pisids* are,—

1. Butterfly, or better, pea-flowers.
2. Legumes, or simple pods, for fruit.
3. The odd sepal turned *away* from the stem.

True, these are not all the marks that are useful in distinguishing this family. But they are the most simple and certain at once. Almost all have compound leaves, such as are found on the Locust, Clover, and Acacia. But we cannot be entirely safe in depending on this; for, not to speak of exotics, the Woodwaxen contradicts the point at our very door. But the Woodwaxen has the three great marks all very plainly, and therefore is a true Pisid, belonging clearly to the royal line, hate it as we will.

In this great family there are three sets, or, as we might say, cousinships. They are each marked by some distinctive properties, and each varies in certain degrees and manners from the typical structure which belongs to all.

First. We have a set with perfect pea-flowers and mostly true pods; but in some, as the Tonka-bean, and the Ground-plum of the West, the pod grows thick and fleshy, and closely resembles a drupe, or stone-fruit of some sort. In this tribe we meet with nearly all the species that afford valuable food to man or beast. We hardly need to cite examples.

Second. We find a set with flowers quite indefinite in form; some nearly perfect by the type, and others almost as regularly five-petalled and circular as an apple-bloom. But here the pod keeps as close to the normal style as the flower departs, so that we never lose our guide. In this set are the chief medicines and drugs that the family produces. We see examples of this tribe in the Wild Senna and Honey Locust.

Third. A set remains in which the pea-shape is wholly obsolete, the flowers being as completely regular as any to be found. The pods, however, so far as we are informed, preserve the simple form, and our marks are fully vindicated. We have no indigenous plant that belongs here; the greenhouse Acacias are those most familiar. The peculiar properties appear in the abundant production of gum and tannin.

Like princes true, these plants take up nearly every variety of stature, habit, and soil. In regard to size, their range is perfectly enormous. In the gardens are species of Lotus that the gardener loves, and species of Medicago that he hates for the wretched weeds that they are, and neither of them is an inch high, but they creep on the earth like a carpet. There are perfect plants of the Pussy Clover that will go into an ounce vial with little crowding. Then, *per contra*, take the great Locusts of Brazil, described by Von Martius. Fifteen Indians, with outstretched arms, could just encircle the base of one of them. Some were measured and gave eighty-four feet in girth at the ground, and sixty feet where they first became cylindrical in form. This reliable observer made careful calculations on the age of these trees, and carried it back, in some cases, to the time of Homer, and, by all probability, beyond the Christian Era. The style and habit of these plants vary quite as much. The Honey

Locust, especially where at all stunted or neglected, is a tree that a cat can hardly climb, bristling and horrid, a perfect *chevaux-de-frise* of thorns; and the Hog Peanut glides over and round the bushes, where it climbs with a stem hardly strong enough to bear its own foliage, a half invisible thread of green. The Bauhinias bind themselves round the great South American trees like ropes of wire; the Wistarias climb and revel in the Chinese thickets like grape-vines; while the Sensitive Briar creeps timidly among the herbage of the Carolinas, and the graceful little Tare intrudes in northern fields, presuming on its good looks for a chance of renewed impertinence. They are hardly as partial to maritime situations, yet the Beach Pea loves no place so well as its "home by the deep, deep sea," and the Wild Bean equally delights to hang its wanton herbage over bluffs where it can hear the scream of gulls, and see the fisherman casting his lines, hardly more twisted than its own.

As hinted already, the nobility is very different from that of the *Asterids*. That family surprises us by its inutility; this overwhelms us by its wonderful wealth. There is hardly a thing of any use to man that is not, somewhere or other, produced by this family. The other was the royalty of blood and self-complacency; this is that of profusion, extravagance, abundance without limit or stint. We are not writing a volume, and so will not try any enumeration of the thousand products here to be found; but do we desire fine timber? We may take our choice of Rosewood, West India Locust, Itaka-wood, Purple-heart, Acacia-wood, Mora-wood, and a score of others, not forgetting our own Locust, whose fibre defies almost every destroying agent but the borer.

Or would we prefer dyes? Logwood and Indigo, Gum

Lac and Dragon's Blood come at call, with Brazil-wood, Brasiletto, Camwood, Sappan-wood, and Red-sanders. Besides, in India, there are fine yellow dyes from several Buteas, and in Japan from a large tree (nameless to us), while we may have almost as good from the Woodwaxen. If we seek perfumes we shall not go far astray. Tonka-beans, Lign-aloes, Calambac, Balsam of Peru, Balsam Tolu, and Acacia-flowers, are ready representatives in this department. The tanner needs little help from any other tribe if he only have this. The Acacias, Bauhinias, and Cassias give their bark, and Prosopis its pods for his purpose, and they fairly dispute precedence with the Oak and Sumach. In gums they rule the world. Gum Arabic, Tragacanth, Senegal, Animi, Brazilian Copal, and Kino attest this. And yet in drugs their precedence is greater still. Liquorice comes here, with Manna, Senna, Cowhage, Fenugreek, Copaiva, and Catechu, and perhaps a hundred more might be added. If we like to study poisons, we might get a large selection of specimens here; in fact, there is a suspicious character, a kind of royal treachery, underlying the whole group. The beautiful scarlet seeds sold in the shops for beads, and called by the children "Black-eyed Susans," are reported as highly poisonous; certain wild plants of this family once killed whole flocks of sheep in the Swan River Colony; and others are common fish-poisons in Jamaica. Indigo is by some pronounced to be deadly, but others dispute the point seriously. There are not, perhaps, many of these hurtful products that appear as known drugs, but they are none the less present. The seeds of various Sweet Peas have been used in Europe during famine, with such evil effect that they had to be interdicted by government. The Coronillas, common in gardens, are likewise condemned; and the seeds of the Laburnum have done serious mischief.

But despite some poisonous and hurtful tendencies, there is a noble excellence in the royal race. They furnish food unmeasured to thousands of hungry dependents. We may begin with the Peanut, indispensable everywhere, from the Yankee town-meeting hall and circus, to the negro-huts of Senegambia. The quantity of these consumed for food the world over is probably far greater than generally supposed. As to Peas and Beans, not only does the soldier of the Rebellion fully know their value, and every New Englander who loves his Sunday breakfast bear witness, but the world admits it all since the time when Daniel and his three friends grew fatter upon pulse than on the King's meat. The sacred writer does not say they changed their diet from the "King's meat" to the very flesh of royalty, but so it really was. The Tamarind is the cheerful friend of the convalescent, and Shenstone says of a drink skilfully made from it,—

> "Whoso drank the cooling draught
> Would never wish for wine."

There are several sorts, produced by related plants, and known as Brown Tamarinds, Velvet Tamarinds, and Tamarind Plums, all highly prized. The Carob-tree has a pod in which the seeds are buried in a dry, mealy pulp, very nutritious, and eaten freely by horses in Spain and the Levant. It is supposed to be the tree which furnished the "locusts," or locust-pods, that fed John the Baptist in the wilderness. The West India Locust affords something very similar, and as readily eaten. The Parkia, an African tree, furnishes seeds of which the natives make a sauce for meat, in cakes like chocolate, eating also the pulp found in the pods. The famous drink of Central

America, the Chica, deserves mention, as prepared from the sweet pods of a Prosopis; but the manner of making it is such as would forever sicken any one not well hardened in savage life.

Of course these are not all the points of wealth in this noble family. Their treasury never is bankrupt. The Bauhinias have tough bark that makes good ropes. We have in New England a plant called Rattle-pod; and another of this same genus in India produces the Bengal Hemp, very useful for cheap bagging. Some are effectual to destroy vermin, and others yield a juice much employed in the manufacture of Indigo in certain parts of the process.

The beasts fare no worse than their human guardians. At the head of the list stands Clover, so acceptable in its green state to the horse, that it is said that he will eat it till he bursts. Closely related to this are the various species of Lucern and Medick, and sundry Trefoils, all sweet and nourishing to every flock and herd. Saintfoin and Serradilla stand in the same line of usefulness. In the arid deserts of the East grows a stunted bush, the tender character of whose herbage has, in those wastes, earned it the name of the Camel's Thorn. Among the Afghans this plant is depended on above all others for the support of cattle, and if the supply is cut off by war at any time, the herds suffer or perish. So the Woodwaxen is eaten well by sheep, it is said; and many farms, we learn, are pastured in the British Islands at good rates, though they produce little save the prickly "Whin."

Nor would the kingly rank be well sustained by the *Pisids* if they could not boast of beauty; but in this there is no more lack than in other respects. The most splendidly beautiful tree in the world, when in flower, is said to be the *Amherstia nobilis*, a grand ornament of the Turkish gardens. There also the Cercis, or Judas-tree, lifts its head in purple magnificence; while its plainer, but still charming co-species, the Red-bud of the Canadas and Northern States, is glowing through the woods in the pride of its early bloom. All New Holland is golden with a wealth of Acacia-flowers; and other species, with red instead of yellow, put the most charming blush on the forest-cheek of Mexico. Europe is rich in fine Laburnums; and South America is all aglow with splendid Ingas and Mimosas. The Californian has brought from New Zealand the Glory-pea, and given it a home by his own door, that suits as well as its own. Our own country is full of beautiful plants of this kind; Lupines and Locusts, Hoary Peas, Wistarias and Prairie Clovers, Tick-trefoils and Yellow-wood, Partridge-peas and Ground-plums, all showy and lovely. And whosoever will penetrate the conservatory, and study the floral wealth there displayed by these pea-flowered princes, will find these thoughts well sustained and illustrated.

And yet we have only just come to the most interesting trait in the character of these most royal plants. In them does vegetable life reach its acme, and attain a grade that lacks but the merest step to equal the vitality of animals. The Joint-vetch, of the Virginian river-banks, is sometimes sensitive, and shrinks from the touch, closing its leaflets. Another step, and we have the Sensitive Briar, common through the South, and showing this sensibility in a much higher degree. Then going to Central and South America, we have Mimosas endowed with every degree of this power, till some will hardly bear the human breath upon them, even though they may bear the beating of wind and weather. Great numbers of *Pisids* keep careful watch of storm and sunshine, however, as well as of day and night, and close their leaves promptly when unfavorable conditions arise. This is but a small matter; other plants do the same; but no other tribe shows such tenderness of feeling in the foliage. Nor do they stop here. In the East Indies grows the strange plant, *Desmodium gyrans*. It may be compared, perhaps, in appearance, to our Wild Indigo, but its leaves are more like those of the Rose. The leaflet at the end only folds up at night and opens by day; but the side-leaflets are always moving, the two sides alternately up and down with a jerking motion, as one says, like the second-hand of a watch. The touch arrests it, or so does cold or narcotics. But left to itself it soon begins again.

Now this, seeing there are here no bones, joints, muscles, or other machinery to execute such movements, is a most astonishing thing. Nearest of anything the world affords does it come to showing the Abstract Life working independently, without mediate agency, and challenging all our skill to grasp it, or account, in any satisfactory way, for the presence that we so unequivocally recognize. Electrical and chemical action are called to explain it, but they fail. We leave it, as one of Nature's mysteries.

This hasty glance gives but a superficial notion of the real grandeur of this most kingly of these Royal Orders. From these considerations, however, we may probably gain sufficient evidence to prove the great importance of these plants in the economy of nature, as related both to man, to the animal kingdom in general, to the great principles of vitality and development, higher and broader than all. A further illustration of these ideas may be had from the study of the other of these families, which will engage our future attention.